

MODULE IV - INCINERATION

The incinerator consists of an oil fired rotary kiln with an oil-fired afterburner. The off-gas pollution control system consists of a cyclone dust separator between the kiln and afterburner, and a high temperature cast ceramic filter baghouse prior to the high temperature draft fan and exhaust stack. Waste is fed through an interlocked waste feed monitoring system to a single conveyor which empties into a feed hopper, which empties into the kiln. The solid waste exits the rotary kiln at the discharge/burner end. It is removed by the discharge conveyor and collected in drums. Additional details on the design of the system are found in Attachment 14.

IV.A. OPERATION AND MAINTENANCE

- IV.A.1. The Permittee shall maintain and operate the incineration system in accordance with the drawings, specifications, and procedures contained in Attachments 10, 11, 13, 14, and 15.
- IV.A.2. Modifications to the drawings and specifications for the incineration system shall be allowed only in accordance with the permit modification requirements in Condition I.D and UAC R315-3-4.3.
- IV.A.3. All process monitors, required pursuant to Conditions IV.E, shall be equipped with alarms operated to warn of deviation or imminent deviation from the limits specified in Condition IV.D.
- IV.A.4. The Permittee shall maintain the incinerator and ancillary equipment in good repair. Routine maintenance shall be performed at sufficient frequency to ensure the incinerator remains in good repair. Malfunctions and deterioration shall be corrected as expeditiously as possible.
- IV.A.5. The Permittee shall maintain the incineration system such that when it is operated in accordance with the requirements in this permit, it will meet the performance standards specified in Condition IV.B.

IV.B. PERFORMANCE STANDARDS

- IV.B.1. The incinerator shall achieve a destruction and removal efficiency (DRE) of at least 99.99% for each of the principal organic hazardous constituents (POHCs) designated below.
 - a. hexachlorobenzene (HCB)
 - b. dinitrotoluene (DNT)
 - c. nitroglycerin (NG)

$$DRE = \frac{W_{in} - W_{out}}{W_{in}} * 100\%$$

The DRE shall be calculated in accordance with the formula given below.

Where: W_{in} = mass feed rate of one POHC in the waste feeding the incinerator
 W_{out} = mass emission rate of the same POHC present in exhaust emissions prior to release to the atmosphere

The DRE may not be rounded up to meet the required standard of 99.99%.

- IV.B.2. The incinerator shall not emit particulate matter in excess of 180 milligrams per dry standard cubic meter (0.08 grains per dry standard cubic foot) when corrected to 7% oxygen in accordance with the formula given below.

$$P_c = P_m * \frac{14}{21 - Y}$$

Where: P_c = corrected concentration of particulate matter

P_m = measured concentration of particulate matter

Y = measured O₂ concentration (%) in the stack gas on a dry basis

- IV.B.3. The Permittee shall control hydrogen chloride (HCl) emissions, such that the rate of emissions is no greater than the larger of either 1.8 kilograms per hour (4.0 pounds per hour) or one percent of the HCl in the combustion gas prior to entering any pollution control equipment.

- IV.B.4. The Permittee shall control emissions of products of incomplete combustion from the stack such that the carbon monoxide (CO) level in the stack, corrected to 7% oxygen in accordance with the formula given below, shall not exceed 100 ppmv, dry basis, over a one hour rolling average and shall not exceed 500 ppmv, dry basis, for more than one minute at any time.

$$CO_c = CO_m * \frac{14}{21 - Y}$$

Where: CO_c = corrected CO concentration (ppmv) on a dry basis

CO_m = measured CO concentration (ppmv) on a dry basis

Y = measured O₂ concentration (%) in the stack gas on a dry basis

- IV.B.5. The Permittee shall control metal emissions from the stack such that the rate of emission for each metal is no greater than the maximum allowable emission rate specified herein.

<u>Metal</u>	<u>Maximum Emission Rate</u>	
	(lb/hr)	(g/hr)
Antimony	0.03086	14

Arsenic	0.00024	0.11
Barium	0.5291	240
Beryllium	0.00044	0.2
Cadmium	0.00057	0.26
Chromium	0.000088	0.04
Lead	0.0150	6.8
Mercury	0.03086	14
Silver	0.3086	140
Thallium	0.03086	14

- IV.B.6. Compliance with the operating conditions specified in Condition IV.D of this permit shall be regarded as compliance with the required performance standards identified in Conditions IV.B.1 through IV.B.5. However, if it is determined that compliance with the operating conditions in Condition IV.D is not sufficient to ensure compliance with the performance standards specified in Conditions IV.B.1 through IV.B.5, the permit may be modified, revoked, or reissued, pursuant to UAC R315-3-4.2.

IV.C. **FEED LIMITATIONS**

- IV.C.1. The Permittee may only feed propellant, explosive and pyrotechnics (PEP) reactive waste munitions. No other wastes except incidental wrappings, holders and PEP containers may be incinerated.
- IV.C.2. Only one type of waste munition or propellant shall be incinerated at a time.

IV.D. **OPERATING REQUIREMENTS AND FEED RATE LIMITS**

The Permittee may feed the wastes described in Condition IV.C. to the incinerator only under the following conditions:

- IV.D.1. The combustion gas temperature at the kiln exit shall be maintained below 680°F. The kiln gas exit temperature shall be monitored and recorded continuously.
- IV.D.2. The kiln rotation shall not be less than 1.0 rpm. The maximum kiln rotation shall not exceed 3.3 rpm. The kiln rotation speed shall be monitored and recorded continuously.
- IV.D.3. The pressure within the kiln combustion zone shall not be above -0.10 inches water column for more than 15 seconds or below -0.50 inches water column for more than 5 seconds. The combustion zone differential pressure shall be monitored and recorded continuously.
- IV.D.4. The combustion gas temperature at the outlet of the afterburner shall be maintained between 1580-1720°F. This temperature shall be monitored and recorded continuously.

- IV.D.5. The carbon monoxide (CO) concentration in the stack exhaust gas, corrected to seven percent oxygen in accordance with the formula specified in Condition IV.B.4, shall not exceed 100 ppmv, dry basis, over a one hour rolling average, and shall not exceed 500 ppmv, dry basis, for more than 60 seconds at any time. The uncorrected and corrected CO concentration in the stack and the one-hour rolling average shall be monitored and recorded on a continuous basis. The oxygen concentration in the stack shall also be monitored and recorded on a continuous basis.
- IV.D.6. The combustion gas temperature at the inlet of the baghouse shall not exceed 1200°F or be less than 790°F. The baghouse temperature shall be monitored and recorded continuously.
- IV.D.7. The pressure drop across the baghouse shall not be less than 3.5 inches W.C. (inches H₂O). Pressure drop across the baghouse shall be monitored and recorded continuously.
- IV.D.8. Combustion gas velocity, measured at the stack, shall not exceed 53 feet per second. The combustion gas velocity at the stack shall be monitored and recorded on a continuous basis.
- IV.D.9. The Permittee shall limit the total PEP feed rate to 229 pounds per hour.
- IV.D.10. The total potential particulate generation rate of items fed to the incinerator shall not exceed 43.420 pounds per hour. The potential particulate generation rate for the items fed is calculated by the following method: (1) A particulate generation factor (mass of potential particulate emissions per mass of reactant) is obtained from Attachment 12 for each component in the feed. (2) These factors are then multiplied by the feed rates of their respective components to obtain a potential particulate generation rate for each component. (3) The potential particulate generation rate for each component is then summed for a total potential particulate generation rate.
- IV.D.11. The total chloride fed to the system shall not exceed 3.410 pounds per hour.
- IV.D.12. The Permittee shall not exceed the maximum metal feed rates to the incinerator as specified herein.

<u>Metal</u>	<u>Maximum feed rate (lb/hr)</u>
Antimony	0.109
Antimony (elemental)	3.146
Arsenic	0.00024
Barium	5.939
Beryllium	0.00044
Cadmium	0.00057
Chromium	0.01
Lead	0.279
Lead (elemental)	154.14

Mercury	0.031
Silver	0.31
Thallium	0.031

- IV.D.13. The speed of the feed conveyor and the cycle frequency of the waste feed rate monitoring system shall be set such that no more than one batch of feed is on the feed conveyor at any given time.

IV.E. **MONITORING, RECORDKEEPING, AND CALIBRATION REQUIREMENTS**

- IV.E.1. Hazardous wastes may be fed to the incinerator only when all instruments required by this condition are on-line and operating properly.
- IV.E.2. The Permittee shall maintain and operate the monitoring and recording equipment and record the data specified in Conditions IV.D.1 through 8 and Conditions IV.E.5 through 6 while burning hazardous wastes. The data shall be monitored and recorded as specified in Conditions IV.D and IV.E. The monitoring equipment shall provide accurate data.
- IV.E.3. The oxygen concentration and uncorrected CO concentration shall also be recorded continuously during the daily calibration checks.
- IV.E.4. The monitoring instruments shall be calibrated in accordance with Attachment 13. Records shall be maintained of any calibrations or maintenance performed on any of these instruments.
- IV.E.5. The munition feed rate shall be monitored and recorded. This shall be accomplished by recording the time the system is feeding waste and the number of items and/or the weight fed during each batch. The type of munition fed shall also be recorded. The feed rate shall be quantified in pounds per hour.
- IV.E.6. The feed rate of all waste materials shall be monitored and recorded on a daily basis. The feed rate shall be quantified in pounds per hour.
- IV.E.7. Prior to incinerating any munition, the Permittee shall have sufficient waste analysis data for that material to demonstrate that the feed rates specified in Conditions IV.D.9 through 12 will be met at the programmed munition feed rate. This information must be available for review by the Executive Secretary at the incinerator whenever the material is being incinerated.
- IV.E.8. Alarms generated by the plant control system shall be recorded and made available for review by the Executive Secretary.
- IV.E.9. The Permittee shall record the date and time of all automatic waste feed cut-offs, including the triggering parameter(s), reason for the cut-off, and corrective action(s) taken. The Permittee shall also record all failures of the automatic waste feed cut-off system to function properly and corrective actions taken.

IV.E.10. The Permittee shall comply with UAC R315-14-7, which incorporates 40 CFR 266 Appendix IX, Section 2.1, *Performance Specifications for Continuous Emission Monitoring of Carbon Monoxide and Oxygen for Incinerators, Boilers, and Industrial Furnaces Burning Hazardous Waste*, by reference.

IV.E.11. Copies of the data collected under this condition shall be provided to the Executive Secretary upon request. The data shall be provided in electronic format if requested.

IV.F. **WASTE FEED CUT-OFF REQUIREMENTS**

The Permittee shall operate and maintain the systems to automatically cut-off the hazardous waste feed to the incinerator under any of the following conditions:

SYSTEM PARAMETER	IMMEDIATE CUTOFF LIMIT	DELAYED CUTOFF LIMIT	DELAY PERIOD
1. Kiln temperature	>680EF	N/A	N/A
2. Kiln rotation	< 1.0 rpm	N/A	N/A
3. Kiln rotation	>3.3 rpm	N/A	N/A
4. Kiln pressure	N/A	>-0.10" W.C.	15 seconds
5. Kiln pressure	N/A	<-0.50" W.C.	5 seconds
6. Afterburner temperature	<1580EF	N/A	N/A
7. Afterburner temperature	>1720EF	N/A	N/A
8. Baghouse temperature	<790EF	N/A	N/A
9. Baghouse temperature	>1200EF	N/A	N/A
10. Baghouse pressure drop	<3.5" W.C.	N/A	N/A
11. CO concentration in the stack (corrected to 7% O ₂ , dry basis)	>100 ppmv (one hour rolling ave.)	>500 ppmv	60 seconds
12. Stack gas velocity	>53 fps	N/A	N/A
13. Kiln burner flame out	loss of flame	N/A	N/A
14. Afterburner flame out	loss of flame	N/A	N/A
15. CO/O ₂ gas monitor	Failure	N/A	N/A
16. Waste feed scale	Failure	N/A	N/A
17. Retort combustion air fan	Failure	N/A	N/A

SYSTEM PARAMETER	IMMEDIATE CUTOFF LIMIT	DELAYED CUTOFF LIMIT	DELAY PERIOD
18. Retort burner controls	Failure	N/A	N/A
19. Afterburner controls	Failure	N/A	N/A
20. Afterburner combustion air fan	Failure	N/A	N/A
21. Draft fan	Failure	N/A	N/A
22. Draft fan controller	Failure	N/A	N/A

IV.F.26. In addition to the waste feed cut-off systems and associated set points specified in Conditions IV.F.1 through 23, the Permittee shall construct and maintain additional systems to manually or automatically cut-off the waste feed to the incinerator under any of the following conditions:

IV.F.26.a. Any mechanical malfunction with either the incinerator system or controls which would compromise the integrity of the system.

IV.F.26.b. Air pollution control device waste residue collection bins, hoppers, or containers are full and additional waste feeds would cause these receptacles to overflow.

IV.F.27. The waste feed rate monitoring system shall be programmed so that the combination of weight allowed per cycle and the cycle frequency will not allow the feed rates specified in Conditions IV.D.9 through IV.D.12 to be exceeded.

IV.F.28. In the case of a malfunction of the automatic waste feed cut-off system, the Permittee shall immediately initiate the furnace shut down procedure as described in Attachment 11. The Permittee shall not restart the waste feed until the problem causing the malfunction has been identified and corrected.

IV.F.29. If the automatic waste feed cut-off system fails to function properly, the Permittee shall notify the Executive Secretary in writing within seven days indicating the reason for the malfunction and also describing corrective measures taken by the Permittee to preclude future occurrences.

IV.F.30. The Permittee shall test the emergency waste feed cut-off system and associated alarms listed in Conditions IV.F.1 through 23 at least weekly to verify operability. For purposes of this waste feed cutoff test, weekly is defined as 168 hours of operation on hazardous waste. Shutting off the fuel supply at each of the burners will be considered sufficient for testing the cutoff systems associated with Conditions IV.F.13 through 14. Additionally, the waste feed cutoff test may be run with the afterburner low temperature interlock set at 1300EF.

IV.G. **TESTING REQUIREMENTS**

IV.G.1. The Permittee shall conduct periodic sampling and analysis of the waste and exhaust emissions to verify that the operating requirements established in the permit achieve the performance standards. This sampling and analysis or subsequent performance testing shall be performed during each odd calendar year (i.e. 2001, 2003, etc.) or more often if requested in writing by the Executive Secretary. The performance testing, as required by this condition, is not for the purpose of establishing new permit limits. The Permittee must follow the modification procedures in Condition 1.D and UAC R315-3-4.3, which incorporates 40 CFR 270.42 by reference, and conduct a trial burn for establishing new limits. If a trial burn is conducted during an odd calendar year, the Permittee may petition the Executive Secretary to allow it to count for that year's required performance test. If a trial burn is conducted during an even calendar year, the Permittee may petition the Executive Secretary to allow it to count for the following year's required performance test.

IV.G.2. At least six months prior to a scheduled performance test, the Permittee shall submit a test plan describing the parameters to be tested for, the sampling and analytical methods to be used, the quality assurance/quality control procedures to be followed, and any other necessary information for approval from the Executive Secretary. Within 90 days of the conclusion of the performance test (defined as the last day that samples were collected at the site) a report shall be submitted to the Executive Secretary. The report will include a copy of all data collected during the performance test and calculations and determinations to show whether the performance standards outlined in Condition IV.B. were met. The calculations and supporting data shall also be submitted electronically.

IV.H. **INSPECTION REQUIREMENTS**

IV.H.1. On at least a daily basis, when in operation, the Permittee shall thoroughly, visually inspect the incinerator, afterburner, off-gas pollution control system, and associated equipment (piping, valves, ducting, feed systems, etc.) and containment systems for leaks, spills, fugitive emissions, deterioration, excessive wear, and signs of tampering per Attachment 4. These inspections shall be accurately documented.

IV.H.2. On at least a daily basis, when in operation, the Permittee shall thoroughly, visually inspect the monitoring instrumentation for out of tolerance and recorded operational data. These inspections shall be accurately documented.

- IV.H.3. The metal and ash residues from the discharge of the incinerator shall be separated and inspected before these items are removed from the paved area of Building 1320. This inspection shall be performed within the next twenty-four hour operating period or within seven calendar days following the incineration of the hazardous waste. Ash residues shall be placed in a container and managed as a hazardous waste. Any un-detonated munition shall be recycled back into the incinerator. This event, along with the quantity and type of un-detonated munition, shall be recorded in the operating log.